

**LONE STAR INDUSTRIES, INC.****Cement & Construction Materials Group**

Seattle Cement Plant  
3801 E. Marginal Way South  
Seattle, Wash. 98134

THE PLANT

The Seattle Cement Plant was originally constructed in 1929. The plant consists of 2 kilns and 3 tube mills capable of producing 200,000 tons of clinker per year. Included is supporting equipment, such as: Slurry, clinker, and cement storage/handling; the hammerhead and bridge cranes; and coal firing system.

Through the years, several improvements and additions were made in the plant operations. A few of them include: Induced draft fans; additional dust collection and precipitator modification; a secondary crusher and material handling system; and new finish grinding mills including additional cement and clinker storage silos.

The new finish system, completed in 1969, increased the cement grinding capacity to 750,000 tons per year.

Due to advanced age and increased maintenance costs, both of the cranes were mothballed and replaced by systems that can be serviced with a front-end loader.

THE PROCESS

The production of portland cement is basically the same in any cement plant. (Refer to the flow sheet.)

Raw Feed

The raw materials include limestone, silica sands, and an iron source. These are proportioned according to their chemistry to produce the proper raw mix.

The mixed materials are reduced to 1-1/2 inch or less in size and fed into the raw mills. The feed is open circuit ground to a slurry of approximately 32% water with a solids fineness of 90% passing a #200 mesh screen (3/1000"). The slurry is milled into the mix/holding tanks and analyzed prior to use. Blending can be used if necessary to assure the proper chemistry before it is pumped to the kiln feed tank.

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### Burning

The slurry feed to the kilns is controlled in proportion to the kiln speed from the burner floor (control room) to maintain stable operation and complete burning.

The feed goes through several stages in the kiln before it is changed into clinker.

The slurry is dehydrated in the chain section of the kiln, about the first third of the kiln. The chains in this area serve two functions -- to transmit the heat from the gas stream to the feed bed, and to keep the dust that escapes the kiln to a minimum.

After leaving the chains, the feed is raised to 1400<sup>0</sup> F. At this temperature, the limestone is calcined (the calcium carbonate is decomposed to carbon dioxide and calcium oxide lime) in preparation for the clinkerization process.

The feed progresses from the calcination zone to the burning zone where the temperature of the feed is raised to 2700<sup>0</sup> F. before combining the raw materials into portland cement clinker.

The clinker that has been formed falls into coolers where the temperature is dropped to maintain the crystal structure, to make the material safe to handle, and to recover otherwise wasted heat.

The clinker is also analyzed and blended before storage in the silos.

### Finish Grinding

The clinker along with 5% gypsum addition is ground in the finish mills.

The finish mills grind closed circuit, and mechanical air classifiers are used to fraction the ground clinker. The fine fraction is the portland cement, and the coarse fraction is returned to be reground with the new feed.

The cement, having a fineness of 91% passing a #325 mesh screen (1.7/1000"), is cooled and moved with an air conveyor system to the storage silos for bulk shipments (trucks, rail cars, or barges) or to be sacked.